granular protoplasm of even the largest tentacula); *e* represents a portion of the parenchyma which appears to protrude after rupture of a contracting vesicle (thus apparently showing that the fluid contents of this organ are expelled externally); *f*, *f*, vesiculæ or contracting vesicles; *g*, nucleus? *h*, bodies like the "reproductive cells;" *i*, portions of food in process of digestion, among which is a rotiferous animalcule; *k*, a tentaculum, truncated in the drawing only. N.B. The body has not been filled up with the vacuolar parenchyma, nor have the actiniform tentacula been scattered over it, as in nature, to save trouble in the drawing, &c.

*Fig.* 22. The same, magnified small specimen of (?), with the actiniform tentacula bearing little pellets of the investing membrane (?).

*Fig.* 23. The same; another specimen (?), where the investing membrane is carried out by the tentacula into an arachnoid form; the body presenting the nucleus and a portion of crude food.

*Fig.* 24. The same; another specimen (?), where the investing membrane has not only been carried out into an arachnoid form, but apparently has also assumed a hastate form at the ends of the tentacula respectively.

Figs. 22–24 are drawn upon no scale, but in body may be set down as about $\frac{1}{500}$th or $\frac{1}{600}$th of an inch in diameter respectively.

*Fig.* 25. *Acanthocystis turfacea*, n. sp. et gen., magnified; on the scale of $\frac{1}{12}$th to $\frac{1}{3700}$th of an inch: *a*, body; *b*, minute, curved, fusiform spicules covering the capsule; *c*, *c*, *c*, forked spines; *d*, *d*, *d*, tentacula, granuliferous; *e*, nucleus; *f*, vesicula discharging itself; *g*, chlorophyll-cells; *h*, starch-granules; *i*, a spine, more magnified; *k*, proximal or discoid end; *l*, distal or forked end; *m*, more magnified representation of a fusiform spicule.

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## IV.—*On the Animal and Affinities of* Fenella; *with a List of the Species found in the Seas of Japan.* By Arthur Adams, F.L.S. &c.

In the 'Annals' for 1860 I described some exquisitely sculptured little shells under the common appellation of *Dunkeria*, a form of Pyramidellidæ separated by P. P. Carpenter from *Turbonilla* on account of their convex whorls. At Takano-Sima, on the East coast of Niphon, I afterwards discovered the animal of my genus *Fenella* (by mistake printed *Finella* in the 'Annals' for 1860), and found it to possess all the characters of a Rissoid. A comparison of my *Dunkeriæ* and *Fenella pupoides* has convinced me that they all belong to the same Rissoid group.

The species I examined was the original type, *Fenella pupoides*, A. Ad. It occurred in tolerable abundance on a sandy-mud bottom, in 2 fathoms water, at Takano-Sima. The head is broad, dilated, and flattened; the muzzle large, long, annular, and of a pale brown colour, edged with white. The tentacles are small, filiform, wide apart, and of an opake-white colour. The eyes are small, black, and sessile, in the centre of white spaces on the sides of the head, behind the bases of the tentacles. The foot is

long and narrow, truncate in front, with parallel sides, pointed behind, and entirely of a white colour. It swims at the surface of the water, shell downwards, with great facility, and, in crawling, uses the muzzle to assist the foot.

The nearest allied genus to *Fenella* is *Alvania* of Risso, which comprises some small Rissoid shells with cancellated whorls and a marginal varix to the outer lip. The genera *Bittium*, Leach, and *Cerithiopsis*, Forbes & Hanley, also resemble *Fenella* in the turreted form of the shell; but in both those groups the aperture is emarginate in front. The genus is dedicated to one of Sir Walter Scott's heroines (*vide* 'Peveril of the Peak').

### Genus Fenella, A. Adams.

An. capite proboscidiformi. Rostrum elongatum, cylindricum, annulatum. Tentacula filiformia, distantia. Oculi sessiles, parvi, in areolis albidis ad lateribus capitis, pone basin tentaculorum, positi. Pes elongatus, angustus, antice truncatus, postice acuminatus. Operculum corneum, subspirale.

Testa turrita, subulata seu pupoidea, imperforata; anfractibus decussatis seu cancellatis. Apertura ovali, antice integra; peritremate interrupto; labro simplici, acuto, non reflexo, incrassato aut varicoso.

1. *Fenella pupoides*, A. Ad.

Ann. & Mag. Nat. Hist. 1860.

*Hab.* Takano-Sima: Tsu-Sima: Yobuko: Seto-Uchi.

2. *Fenella asperulata*, A. Ad.

*Dunkeria asperulata*, A. Ad., Annals, 1860.

*Hab.* Mino-Sima: Gotto Islands; 48 fathoms.

3. *Fenella pulchella*, A. Ad.

*Dunkeria pulchella*, A. Ad., Annals, 1860.

*Hab.* Mino-Sima; 63 fathoms: Gotto; 48 fathoms.

4. *Fenella fusca*, A. Ad.

*Dunkeria fusca*, A. Ad., Annals, 1860.

*Hab.* Sea of Okhotsk: Rifunsiri: Mososeki.

5. *Fenella ferruginea*, A. Ad.

*Dunkeria ferruginea*, A. Ad., Annals, 1860.

*Hab.* Sado, 48 fathoms.

6. *Fenella scabra*, A. Ad.

*Dunkeria scabra*, Annals, 1860.

*Hab.* Kino-O-Sima: Bingo-Nada: Tsu-Sima.

7. *Fenella reticulata*, A. Ad.

*Dunkeria reticulata*, A. Ad., Annals, 1860.

*Hab.* Awa-Sima; in shell-sand.

8. *Fenella craticulata*, A. Ad.

*Dunkeria craticulata*, Annals, 1860.

*Hab.* Gotto Islands; 48 fathoms: Mino-Sima; 63 fathoms.

9. *Fenella rufocincta*, A. Ad.

*Dunkeria rufocincta*, A. Ad., Annals, 1860.

*Hab.* Mososeki: Takano-Sima: Tanabe.

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## V.—*Observations on Raphides.* By George Gulliver, F.R.S.

[Continued from vol. xii. p. 447.]

*Raphis-bearing Orders.*—Of British plants we have already shown that there are many orders, as Rubiaceæ, Balsaminaceæ, and Onagraceæ, which are truly raphis-bearing; and an examination of a few exotic species has confirmed the propriety of this character. We have also proved that, in typical plants of this kind, the formation of raphides is a constant, fundamental, essential, and intrinsic result of the vigorous plant-life; and that they are, throughout its existence, so truly part and parcel of its very nature, that we find them abundantly from the ovule to the seed-leaves and thence through all the stages of the plant-growth to the ripe fruit—in short, from the cradle to the grave of the species. And hence, independently of the value of the facts in other respects, raphides may in some instances afford a more certain and useful diagnosis than any other single one which has yet been employed in systematic botany.

While such raphidiferous orders may be closely surrounded, in the natural arrangement, by other orders destitute of raphides, there are, conversely, orders not affording raphides, and yet standing between orders which are regular raphis-bearers. Thus, Hydrocharidaceæ, an order not characterized by raphides, is immediately preceded and succeeded, in Professor Babington's 'Manual of British Botany,' by Dioscoreaceæ and Orchidaceæ—two orders which abound in raphides. Again, *Alisma* and every species which I have examined of *Potamogeton* are devoid of raphides, while all the British orders placed between Alismaceæ and Potamogetonaceæ are remarkably raphidiferous; and numerous other instructive examples of the like kind might be given.

Surely all these facts amount to an accumulation of evidence,